REMARKS

Claims 7-18 are currently pending in the application.

Reconsideration of the present application and allowance of the pending claims as amended is respectfully requested in view of the following remarks.

Amendments

Claims 7 and 13 have been amended to specify that the feed gas mixture is fed into a plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another such that each is offset from another. Support for these amendments can be found in the specification at least at page 10, line 23 to page 12, line 23.

Non-obviousness

The Office Action has rejected claims 7-18 under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 6,221,280 to Anumakonda et al. (hereinafter "Anumakonda") in view of U.S. Patent Publication No. 2002/0041986 to Wojtowicz et al. (hereinafter "Wojtowicz"), in further view of U.S. Patent No. 4,331,451 to Isogaya et al. (hereinafter "Isogaya"), and in further view of U.S. Patent Publication No. 2002/0114747 to Marchand et al. (hereinafter "Marchand"). The Office Action states that it would have been obvious to one of ordinary skill in the art, at the time of the Applicants' invention, to combine Anumakonda, Wojtowicz, and Isogaya to provide heat from an oxidation reaction to an inlet stream in order to prevent the deposition of carbon on a catalyst bed. In addition, the Office Action states that Marchand makes it obvious to one of ordinary skill in the art, at the time of the Applicants' invention, to provide a closed vessel where at least one passage of a heat exchanger extends through a portion of the reaction chamber of Anumakonda in order to use the heat supplied by the exothermic oxidation for other parts of the

reaction. The rejections are respectfully traversed as applied to the claims as amended in view of the following remarks.

Applicant's Claims

Claim 7, from which claims 8-12 depend, describes a method for catalytic partial oxidation of hydrocarbon fuel comprising feeding a feed gas into plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another such that each is offset from another, reacting the feed gas to convert it to an exit gas mixture of hydrogen and carbon monoxide, and passing a heat exchange fluid past the catalytic partial oxidation reactors with the heat exchange fluid flowing in the same direction of reactant flow in the reactors such that heat from partial oxidation in the reactors transfers to the heat exchange fluid. Claim 13, from which claims 14-18 depend, describes a method for producing electric power which comprises steps similar to the steps of claim 7 and additionally comprises directing the exit gas to a solid oxide fuel cell system. By having the plurality of catalytic partial oxidation reactors disposed in a shell *parallel to and spaced from one another such that each is offset from another*, heat produced by the catalytic oxidation reactions is distributed along the shell for more efficient heat transfer (See page 12, lines 6-23). In addition, by passing a heat exchange fluid past the catalytic partial oxidation reactor *in the same direction of reactant flow*, the feed gas mixture in the precatalyst zone can be kept cool and the postcatalyst zone can be kept hot (See page 11, line 20 to page 12, line 1).

The Cited References

Anumakonda discloses an apparatus for catalytic partial oxidation of hydrocarbons. As admitted by the Examiner, Anumakonda does not teach a method comprising passing a heat

exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant flow such that heat from the reactor transfers to the heat exchange fluid. Anumakonda also does not disclose a plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another such that each is offset from another.

Wojtowicz discloses a method for producing a hydrogen-rich gas from a hydrocarbonaceous material by (1) pyrolysis of the hydrocarbonaceous material to produce carbon-rich residue and hydrogen gas and (2) combusting a portion of the carbon-rich residue.

Isogaya discloses a process for catalytic gasification of heavy distillates, where the inlet temperature must be higher than 500°C. As admitted by the Examiner, this disclosure suggests that the inlet temperature should be maintained at a high enough temperature to prevent carbon deposition.

Marchand discloses a steam reforming system comprising a steam reformer which converts a fuel into a reformate stream to be fed into a shift reactor. The shift reactor can be integrated with an absorbent bed to form an integrated reactor. Heat transfer passages extend through the reactor bed so that heat may be transferred from the shift reactor and the absorbent bed to a coolant. The coolant inlet 730 is proximate the reformer outlet 726 and the coolant outlet 732 is proximate the reformate inlet 706. Thus, the coolant travels in a direction opposite the direction of the reformate flow. As a result, the downstream end of the bed is significantly cooler than the front portion. Paragraphs [0156]-[0163].

No Prima Facie Obviousness

According to M.P.E.P. §2142, three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or modification, either in the

references themselves or the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claim combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488 20 U.S.P.Q. F.2d 1438 (Fed. Cir. 1991).

Applicants respectfully submit that Anumakonda, Wojtowicz, Isogaya, and Marchand do not establish a *prima facie* case of obviousness against claims 7 and 13 of this application because none of the prior art references, alone or in combination, teach or suggest all of the claim limitations. As noted above, Anumakonda does not disclose a plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another along the direction of feed gas mixture flow. Nor does Anumakonda disclose passing a heat exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant flow such that heat from the reactor transfers to the heat exchange fluid. Nothing in Wojtowicz, Isogaya, or Marchand, alone or in combination, supplements the deficiencies of the teachings of Anumakonda.

Furthermore, Isogaya teaches away from passing a heat exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant flow, which keeps the feed gas mixture in the precatalyst zone cool. In particular, Isogaya teaches that the inlet should be maintained at a high temperate to prevent carbon deposition. Likewise, Marchand teaches away from passing a heat exchange fluid past a plurality of catalytic partial oxidation reactors in the

same direction of reactant flow because Marchand discloses cooling the downstream portion of the reactor bed with a coolant flowing in the direction opposite the reactant flow so that a higher temperature results in the upstream portion of the bed. A prior art reference that teaches away from the claimed invention is a significant factor to be considered in determining obviousness and does not establish a prima facie case of obviousness. M.P.E.P § 2145; M.P.E.P § 2143; *In re Fine*, 873 F.2d 1071, 5 USPQ 2d 1596 (Fed. Cir. 1988).

Therefore, a *prima facie* case of obviousness has not been established and the Applicants claims are novel and nonobvious.

In view of the present response to Office Action, Applicant respectfully requests that a timely Notice of Allowance be issued in this case. If there are any issues which can be resolved by a telephone conference or an examiner's amendment, the Examiner is invited to telephone the attorney at (404) 853-8036.

Respectfully submitted,

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